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BULLETIN DU MUSÉUM NATIONAL D'HISTOIRE NATURELLE
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The Establishment of a Neotype for *Alpheus edwardsi* (Audouin)

by Albert H. BANNER and Dora M. BANNER *

Résumé. — *Alpheus edwardsi* a été nommé et décrit par AUDOUIN (dans le genre *Athanas*) en 1827, d'après des spécimens de Suez. Le matériel type original a été perdu. Nous redécrivons l'espèce et établissons un néotype sur un spécimen provenant de Suez ; nous notons les variations présentées par l'espèce et les différences qui la séparent d'autres espèces étroitement apparentées. Nous considérons que *A. audouini* Coutière, 1905, est un synonyme plus récent.

Abstract. — *Alpheus edwardsi* was named and described by AUDOUIN (in the genus *Athanas*) in 1827, based on specimens from Suez. The original type material has been lost. We are redescribing the species and establishing a neotype on specimens from the Suez ; we note the variations occurring in the species, and we differentiate between this species and a number of closely related species. We regard *A. audouini* Coutière, 1905, as a junior synonym.

Specimens of the species later identified as *Alpheus edwardsi* were collected by SAVIGNY when he was attached as a naturalist to Napoleon's ill-fated Egyptian campaign. The exact point of collection of these specimens is unknown, but in the period between the time NAPOLEON fled back to France in 1799 and the return of the scientific staff by the English in 1802, it is known that SAVIGNY made one trip to the Red Sea during his stay in the Suez in 1800 ; and he may have also visited Kosseir on the Egyptian coast of the Red Sea during its occupation by the French army in 1799. In 1809 SAVIGNY published plates of this species but without a name *in* : " Description de l'Égypte ". AUDOUIN, in 1827, applied the name *Athanas edwardsii* to the figure published by SAVIGNY, but without further description. The type specimens have been lost. (We are indebted to Dr L. B. HOLTHUIS of Rijksmuseum of Leiden for this history.)

A. edwardsi is closely related to a number of other species in the genus and considerable confusion has arisen as to its characteristics and its separation from related species. An indication of this confusion as early as 1884 is the excellent description and discussion by MIERS (1884 : 284).

We therefore welcome the opportunity to establish a neotype based on a collection from the Muséum national d'Histoire naturelle de Paris. We were loaned a collection of eleven specimens from a collection made in 1864 at Suez before the opening of the canal by Louis VAILLANT, a French ichthyologist who was a professor at the Museum for many years. It should be noted that these specimens were also identified by COUTIÈRE as *A. edwardsi* in 1936.

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Because of the confusion in the use of names, *A. edwardsi*, both in the application of this binomial to many other species and the application of other names to this species (*cf.* Miers, *op. cit.*) we are loathe to append any historical synonymy. We have ourselves seen in museum collections the name *A. edwardsi* attached to not only many other species of the *edwardsi* group, but also even to *Synalpheus neptunus* Dana. We believe it would be safest to withhold such synonymy until the individual specimens reported under their various names be reexamined in comparison to the description that follows.

Alpheus edwardsi (Audouin)

Without name, Savigny, 1809. Description de l'Égypte, Atlas Crust. : pl. 10, fig. 1.
Athanas edwardsii[1] Audouin, 1827. Description de l'Égypte, éd. 2, 22 : 274.
Alpheus edwardsii Guérin Méneville, 1829-44. Iconographie du Règne animal, vol. 2, Crust. : pl. 21, fig. 5 ; vol. 3, Crust. : 15.
Alpheus audouini Coutière, 1905. Fauna and Geography of the Maldive and Laccadive Archipelagoes : 2 (4) : 911, fig. 52.

Neotype : 33 mm male from Suez, collected by L. Vaillant, 1864.

Neoallotype : 35 mm female from same collection as neotype.

Neoparatypes : 3 males and 6 females 22-35 mm in length, from same collection as neotype.

Diagnosis

Rostrum 1.4 times as long as wide at base, reaching to near end of first antennular article. Broad, moderately deep orbitorostral grooves disappearing at posterior margin of orbits. Visible part of first antennular article 0.8 as long as second antennular article which is 2 times as long as broad ; third antennular article 0.5 as long as second. Stylocerite acute, reaching to end of first antennular article. Scaphocerite with squamous portion reaching nearly to end of third antennular article, lateral tooth a little longer. Carpocerite reaching well past end of third article. Lateral tooth of basicerite small, acute.

Large chela 2.3 times as long as broad, fingers occupying 0.3 total length. Superior margin bearing transverse groove proximal to dactylus. Proximal edge of groove obtuse, never acute, overhanging floor of groove ; distal margin of groove rounded ; groove continued on inner face as poorly defined triangular depressed area, the apex of which reaches to proximal quarter of chela ; groove continued on outer face as well-defined quadrangular depression, proximal portion reaching *linea impressa* and inferiorly extending 0.3 width of palm. Deep notch on inferior margin directly opposite superior groove, demarked proximally by heavy shoulder with tip slightly projected but not acute ; distal margin of groove rounded. Inferior groove extends as a slightly depressed triangular area only 0.2 into outer face of palm. Merus 2 times as long as broad, bearing an acute tooth distally on inferointernal margin ; superoexternal and superointernal margins not projecting.

Small chela sexually dimorphic. Male chela 3.8 times as long as broad with fingers 0.6 as long as palm. Superior margin of palm bearing small rounded groove proximal

1. Now to be spelled *edwardsi* according to articles 31 (2) and 32 (a) (i) of the International Code of Zoological Nomenclature.

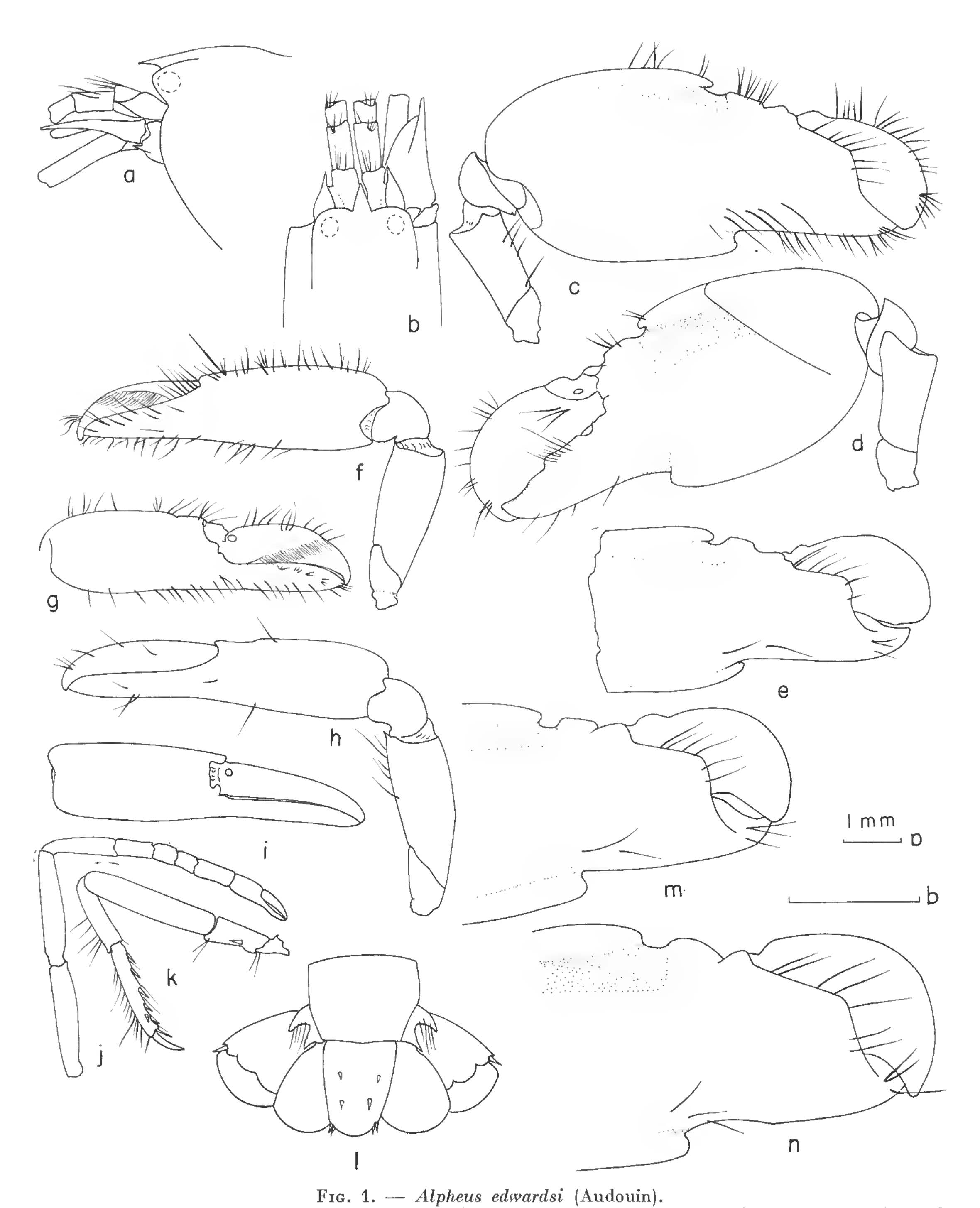


FIG. 1. — *Alpheus edwardsi* (Audouin).
a, b : dorsal and lateral view of anterior region of neotype ; c, d : large cheliped, inner and outer face, of neotype ; e : distal region of large chela of neoallotype ; f, g : small cheliped, inner and outer face, of neotype ; h, i : small cheliped, inner and outer face, of neoallotype ; j : second leg of neotype ; k : third leg of neotype ; l : telson and uropods of neotype ; m : inner face of distal region of chela of 30 mm male neoparatype ; n : inner face of distal region of chela of 35 mm male neoparatype.
a, b : scale b ; all others : scale a.

to dactylus that is extended slightly into outer face ; inferior margin with only slight trace of concavity comparable to groove and shoulder of large chela. Dactylus proximally broadened into a triangular area demarked by fringes of short stiff setae which line margins near articulation of dactyl and curve to meet on superior surface proximal to tip ; this is the usual " balaeniceps" development. Female chela 4.4 times as long as broad with fingers and palm almost equal. Chela with traces of large chela sculpturing, but even less developed than male, and without fringe of setae on dactyl. Meri of both male and female small chelipeds similar, 2.2 times as long as broad and bearing an acute tooth distally on inferointernal margin. External and superior margins not projecting distally.

Carpal articles of second leg with ratio : 10:6:3:3:5.

Ischium of third leg bearing strong spine. Merus of third leg 5 times as long as broad, inermous. Carpus 0.5 as long as merus, superodistal margin projecting into a tooth. Propodus almost 0.8 as long as merus, bearing 6 inferior spines and 2 distal spines. Dactylus simple and slightly curved, 0.3 as long as propodus.

Telson 2 times as long as posterior margin is broad ; spines on dorsal surface small ; outer pair of terminal spines as long as dorsal spines, inner spines a little longer.

The neotype and neoallotype will be deposited in the Muséum national d'Histoire naturelle de Paris.

Variation

We made a study of 16 specimens of *A. edwardsi* selected from a large Australian series to determine the extent of normal variation. The 9 paratypes from Suez fell within this range of variation, but were not studied as closely. The following characteristics used in distinguishing the species were found to vary :

1. The rostrum varied from 1.4-2.0 times as long as broad at the base.
2. The ratio of the first and second article of the antennular peduncles varied from 10:13-10:16 ; the ratio of the visible part of the first to third antennular article varied from 10:6-10:10.
3. The amount of overhang on the grooves on the superior and inferior margins of the large chela were found to exhibit variation as shown by figs. 1c, e, m, n (figures from Suez neoparatypes).
4. The small chela varied in males from 3.4-4.4, and in the females from 3.8-5.4, times as long as broad.
5. The first two carpal articles of the second leg varied from 10:5-10:8.
6. The merus of the third leg varied from 4.3-5.3 times as long as broad.

It should be noted that in all specimens examined the first carpal article of the second leg was definitely longer than the second. This is consistent with Savigny's figure in which the ratio of the first and second article is 10:6.

Discussion

In 1905 Coutière separated his new species *A. audouini* from *A. edwardsi* solely on the basis that in *A. audouini* the proximal lobe of the superior and inferior margins of the large chela were not spinose, but obtuse, " en ogive ". He stated that in all other ways

A. audouini resembled *A. edwardsi* as figured by Savigny. We have examined the figures of Savigny (pl. 10, fig. 1) and find that the large chela in the lateral view of the whole animal (fig. 1, 2) is plainly not spinose, but " en ogive ". The chela of the figure shown in dorsal view (fig. 1, 1), is also not spinose, although it appears to be a little more acute than shown in the figure in the lateral view. We have examined at least 100 specimens of *A. edwardsi* from Australia and in none were the lobes overhanging the grooves of the large chela spinose. Therefore we have placed *A. audouini* into synonymy. However in our Australian collection we recognize as separate 45 specimens which exactly agree with Savigny's figure *A. edwardsi* except the lobes on the inferior and superior margins of the large chela are spinose. Further the rostrum is subulate, not cone-shaped, and at least 2.0 times as long as broad at the base. This is the form that Coutière calls *A. edwardsi chiragricus*, demoting the specific name applied by H. Milne-Edwards. We recognize *A. chiragricus* as a separate species, and will discuss it more fully in Part III of our monograph of the Alpheidae of Australia.

We feel Coutière himself may have changed his mind as to the correctness of the separation of *A. audouini* from *A. edwardsi* since the 11 specimens loaned by the Muséum national d'Histoire naturelle de Paris from which we selected the neotype and neoallotype were identified by him in 1936 as *A. edwardsi*. None of these had spinose lobes on their chelae.

This species is closely related to 6 other members of the *edwardsi* group. In a preliminary study for the monograph of the Australian Alpheidae we have separated these 6 closely related species from *A. edwardsi* as follows :

A. crassimanus Heller : The proximal shoulder of the superior groove on the large chela is never projected. The fully-developed small chela of the males carry definite notches both on the superior and inferior margin of the palm (*cf.* Banner and Banner, 1959 : 147).

A. pacificus Dana : The meri of the chelipeds are inermous ; the small chela of neither sex has a balaeniceps dactylus, but the dactylus in the male may carry a heavy marginal fringe.

A. strenuus Dana : The small chelae of both sexes have balaeniceps dactyli.

A. chiragricus H. Milne-Edwards : See above.

A. leviusculus Dana : The groove on the superior margin of the large chela continues into the inner face only as a slight " U ". The balaeniceps condition of the dactylus in the small chela of the male is minimal and the fringe of setae usually does not pass over the top of the dactylus.

A. leptochirus Coutière : The large chela is more slender, 3.0-3.5 times as long as broad ; the small chela is also slender, 5.0 in the male and 5.5 in the female, times as long as broad ; the third leg is very thin with the merus 7.0 times as long as broad.

It should be pointed out that the differences outlined above only obtain when the animal is fully mature.

As stated above, this binomial has been so confused in its use that we cannot trace out the distribution of the species in the Indo-Pacific. On the basis of our own collections we can report it from Red Sea, Australia and Thailand (reported as *A. audouini*). This species probably extends widely through the Indian Ocean, into Southeast Asia and Australia, but not into the islands of the Central Pacific. From what little is presently known

of the distribution of the species, its record by Rankin (1898 : 246 ; 1900 : 539) from the Bahamas and Bermuda may be questioned.

This species is apparently abundant intertidally in areas where it occurs which probably accounts for its inclusion so often in the literature. The fact that the six species listed above also occur intertidally contributes to the confusion in identification.

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